

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-44 (canceled)

Claim 45 (original): A thermosetting composition comprising:

(a) a first reactant comprising functional groups;

(b) a crosslinking agent having at least two functional groups that are reactive with the functional groups first reactant in (a); and

(c) a copolymer flow control agent comprising a copolymer comprised of at least 30 mol % of segments comprising alternating residues derived from a donor monomer selected from the group consisting of isobutylene, diisobutylene, dipentene and isoprenol, and an ethylenically unsaturated acceptor monomer, wherein said copolymer is substantially free of maleate-type monomer segments and fumarate-type monomer segments and the copolymer flow control agent is substantially free of Lewis acids and transition metals.

Claim 46 (original): The thermosetting composition of claim 45, wherein said copolymer has a number average molecular weight of from 500 to 20,000.

Claim 47 (original): The thermosetting composition of claim 45, wherein said copolymer flow control agent is present in an amount of from 0.01 percent by weight to 20 percent by weight, based on the total resin solids weight of said coating composition.

Claim 48 (original): The thermosetting composition of claim 45, wherein said thermosetting composition is a liquid.

Claim 49 (original): The thermosetting composition of claim 45, wherein said thermosetting composition is a solid in particulate form.

Claim 50 (original): The thermosetting composition of claim 45, wherein the functional groups of the first reactant (a) are selected from the group consisting of epoxy, carboxylic acid, hydroxy, amide, oxazoline, aceto acetate, isocyanate, methylol, methylol

ether and carbamate, and the functional groups of crosslinking agent (b) are reactable with those in the first reactant (a), and are selected from the group consisting of epoxy, carboxylic acid, hydroxy, isocyanate, capped isocyanate, amine, methylol, methylol ether, and beta-hydroxyalkylamide.

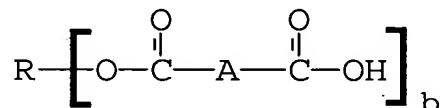
Claim 51 (original): The thermosetting composition of claim 50, wherein said first reactant is selected from carboxylic acid functional polymers, and said crosslinking agent is a beta-hydroxyalkylamide functional crosslinking agent.

Claim 52 (original): The thermosetting composition of claim 50, wherein said first reactant is selected from hydroxy functional polymers, and said crosslinking agent is a capped isocyanate functional crosslinking agent.

Claim 53 (original): The thermosetting composition of claim 50, wherein said first reactant is selected from acid functional polyesters and said crosslinking agent is selected from glycidyl isocyanurates and bisphenol A epoxides.

Claim 54 (original): The thermosetting composition of claim 50, wherein said first reactant is selected from epoxide functional polymers and said crosslinking agent is a carboxylic acid functional crosslinking agent.

Claim 55 (original): The thermosetting composition of claim 54, wherein said first reactant is an epoxide functional acrylic or methacrylic polymer, and said carboxylic acid functional crosslinking agent is selected from the group consisting of dodecanedioic acid, azelaic acid, adipic acid, 1,6-hexanedioic acid, succinic acid, pimelic acid, sebacic acid, maleic acid, citric acid, itaconic acid, aconitic acid, carboxylic acid functional crosslinking agents represented by the following general formula:



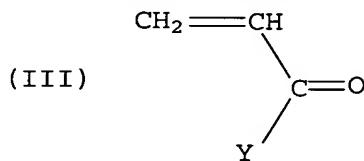
wherein R is the residue of a polyol, A is a divalent linking group having from 2 to 10 carbon atoms, and b is an integer of from 2 to 10, and mixtures of such carboxylic acid functional crosslinking agents.

Claim 56 (original): The thermosetting composition of claim 55, wherein said polyol from which R is derived is selected from the group consisting of ethylene glycol, di(ethylene glycol), trimethylolethane, trimethylolpropane, pentaerythritol, di-trimethylolpropane and di-pentaerythritol, A is selected from the group consisting of 1,2-cyclohexylene and 4-methyl-1,2-cyclohexylene, and b is an integer of from 2 to 6.

Claim 57 (original): The thermosetting composition of claim 45, wherein the copolymer comprises up to 10 mol % of donor monomers selected from the group consisting of styrene, substituted styrenes, methyl styrene, substituted styrenes, vinyl ethers, vinyl pyridine, and mixtures thereof.

Claim 58 (original): The thermosetting composition of claim 45, wherein the copolymer comprises up to 25 mol % of acrylonitrile.

Claim 59 (original): The thermosetting composition of claim 45, wherein the ethylenically unsaturated monomer is one or more described by structure (III):

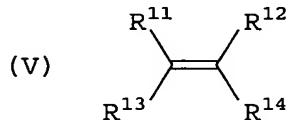


wherein Y is selected from the group consisting of $-\text{NR}^3_2$, $-\text{O}-\text{R}^5-\text{O}-\text{C}(=\text{O})-\text{NR}^3_2$, and $-\text{OR}^4$, R^3 is selected from the group consisting of H, linear or branched C_1 to C_{20} alkyl, and linear or branched C_1 to C_{20} alkylol, R^4 is selected from the group consisting of H, poly(ethylene oxide), poly(propylene oxide), linear or branched C_1 to C_{20} alkyl, alkylol, aryl, alkaryl and aralkyl, linear or branched C_1 to C_{20} fluoroalkyl, fluoroaryl and fluoroaralkyl, a siloxane radical, a polysiloxane radical, an alkyl siloxane radical, an ethoxylated trimethylsilyl siloxane radical and a propoxylated trimethylsilyl siloxane radical, and R^5 is a divalent linear or branched C_1 to C_{20} alkyl linking group.

Claim 60 (original): The thermosetting composition of claim 45, wherein the ethylenically unsaturated monomer is one or more selected from the group consisting methyl acrylate, ethyl acrylate, butyl acrylate, isobutyl acrylate, isobornyl acrylate, 2-ethylhexyl acrylate, perfluoroalkyl ethyl acrylates wherein the perfluoroalkyl group contains 4-20 carbon atoms, benzyl ether acrylates of a C_9 - C_{10} partially fluorinated alcohol, acrylate esters of a C_9 - C_{10} partially fluorinated alcohol, acryloxyalkyl terminated polydimethylsiloxane radicals, acryloxyalkyl tris(trimethylsiloxy silanes), acryloxyalkyl trimethylsiloxy terminated

polyethylene oxide, chlorotrifluoro ethylene, glycidyl acrylate, 2-ethylhexyl acrylate, and n-butoxy methyl acrylamide.

Claim 61 (original): The thermosetting composition of claim 45, wherein the copolymer comprises one or more residues derived from other ethylenically unsaturated monomers of general formula V:



wherein R^{11} , R^{12} , and R^{14} are independently selected from the group consisting of H, CF_3 , straight or branched alkyl of 1 to 20 carbon atoms, aryl, unsaturated straight or branched alkenyl or alkynyl of 2 to 10 carbon atoms, unsaturated straight or branched alkenyl of 2 to 6 carbon atoms substituted with a halogen, C_3 - C_8 cycloalkyl, heterocycl and phenyl, R^{13} is selected from the group consisting of H, C_1 - C_6 alkyl, $COOR^{15}$, wherein R^{15} is selected from the group consisting of H, an alkali metal, a C_1 to C_6 alkyl group, glycidyl and aryl.

Claim 62 (original): The thermosetting composition of claim 61, wherein the other ethylenically unsaturated monomers are one or more selected from the group consisting of methacrylic monomers and allylic monomers.

Claim 63 (original): A method of coating a substrate comprising:

- (A) applying a thermosetting composition to the substrate;
- (B) coalescing said thermosetting composition to form a substantially continuous film; and
- (C) curing the thermosetting composition, wherein the thermosetting composition comprises:
 - (i) A first reactant containing one or more functional groups;
 - (ii) a crosslinking agent having at least two functional groups that are reactive with the functional groups of the first reactant in (a); and
 - (iii) a copolymer flow control agent comprising a copolymer comprised of at least 30 mol % of segments comprising alternating residues derived from a donor monomer selected from the group consisting of isobutylene, diisobutylene, dipentene, isoprenol, and mixtures thereof, and an ethylenically unsaturated acceptor monomer, wherein said copolymer is substantially free of maleate-type monomer segments and fumarate-type monomer segments and said copolymer flow control agent is substantially free of Lewis acids and transition metals.

Claim 64 (original): The method of claim 63, wherein said copolymer has a number average molecular weight of from 500 to 20,000.

Claim 65 (original): The method of claim 63, wherein said copolymer flow control agent is present in said thermosetting composition in an amount of from 0.01 percent by weight to 20 percent by weight, based on the total resin solids weight of said thermosetting composition.

Claim 66 (original): The method of claim 63, wherein the functional groups of the first reactant (i) are selected from the group consisting of epoxy, oxirane, carboxylic acid, hydroxy, amide, oxazoline, aceto acetate, isocyanate, methylol, methylol ether and carbamate, and the functional groups of crosslinking agent (ii) are reactable with those in the first reactant (i) and are selected from the group consisting of epoxy, oxirane, carboxylic acid, hydroxy, polyol, isocyanate, capped isocyanate, amine, aminoplast, methylol, methylol ether, and beta-hydroxyalkylamide.

Claim 67 (original): The method of claim 66, wherein said first reactant (i) is selected from carboxylic acid functional polymers and said crosslinking agent (ii) is a beta-hydroxyalkylamide functional crosslinking agent.

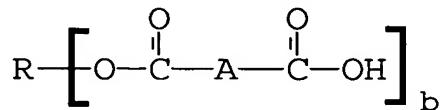
Claim 68 (original): The method of claim 66, wherein said first reactant (i) is selected from hydroxy functional polymers and said crosslinking agent (ii) is a capped isocyanate functional crosslinking agent.

Claim 69 (original): The method of claim 66, wherein said first reactant (i) is selected from acid functional polyesters and said crosslinking agent (ii) is selected from glycidyl isocyanurates and bisphenol A epoxides.

Claim 70 (original): The method of claim 66, wherein said first reactant (i) is selected from epoxide functional polymers and said crosslinking agent (ii) is a carboxylic acid functional crosslinking agent.

Claim 71 (original): The method of claim 66, wherein said first reactant is an epoxide functional selected from acrylic polymers, methacrylic polymers, and mixtures

thereof, and said carboxylic acid functional crosslinking agent is one or more selected from the group consisting of dodecanedioic acid, azelaic acid, adipic acid, 1,6-hexanedioic acid, succinic acid, pimelic acid, sebacic acid, maleic acid, citric acid, itaconic acid, aconitic acid, carboxylic acid functional crosslinking agents represented by the following general formula:



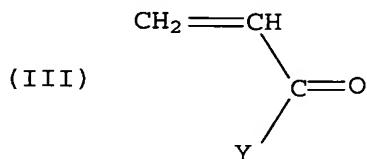
wherein R is the residue of a polyol, A is a divalent linking group having from 2 to 10 carbon atoms, and b is an integer of from 2 to 10.

Claim 72 (original): The method of claim 71, wherein said polyol from which R is derived is selected from the group consisting of ethylene glycol, di(ethylene glycol), trimethylolethane, trimethylopropane, pentaerythritol, di-trimethylopropane and di-pentaerythritol, A is selected from the group consisting of 1,2-cyclohexylene and 4-methyl-1,2-cyclohexylene, and b is an integer of from 2 to 6.

Claim 73 (original): The method of claim 63, wherein the copolymer further comprises up to 10 mol % of donor monomers selected from the group consisting of styrene, substituted styrenes, methyl styrene, substituted styrenes, vinyl ethers, vinyl pyridine, and mixtures thereof.

Claim 74 (original): The method of claim 63, wherein the copolymer further comprises up to 25 mol % of acrylonitrile.

Claim 75 (original): The method of claim 63, wherein the ethylenically unsaturated acceptor monomer is one or more described by structure (III):

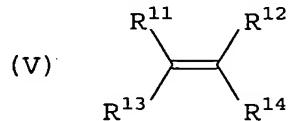


wherein Y is selected from the group consisting of $-\text{NR}^3_2$, $-\text{O}-\text{R}^5-\text{O}-\text{C}(=\text{O})-\text{NR}^3_2$, and $-\text{OR}^4$, R^3 is selected from the group consisting of H, linear or branched C_1 to C_{20} alkyl, and linear or branched C_1 to C_{20} alkylol, R^4 is selected from the group consisting of H, poly(ethylene oxide), poly(propylene oxide), linear or branched C_1 to C_{20} alkyl, alkylol, aryl, alkaryl and aralkyl, linear or branched C_1 to C_{20} fluoroalkyl, fluoroaryl and fluoroaralkyl, a siloxane radical, a polysiloxane radical, an alkyl siloxane radical, an

ethoxylated trimethylsilyl siloxane radical and a propoxylated trimethylsilyl siloxane radical, and R⁵ is a divalent linear or branched C₁ to C₂₀ alkyl linking group.

Claim 76 (original): The method of claim 63, wherein the ethylenically unsaturated acceptor monomer is one or more selected from the group consisting of hydroxyethyl acrylate, hydroxypropyl acrylate, methyl acrylate, ethyl acrylate, butyl acrylate, isobutyl acrylate, isobornyl acrylate, 2-ethylhexyl acrylate, perfluoroalkyl ethyl acrylates wherein the perfluoroalkyl group contains 4 to 20 carbon atoms, benzyl ether acrylates of a C₉-C₁₀ partially fluorinated alcohol, acrylate esters of a C₉-C₁₀ partially fluorinated alcohol, acryloxyalkyl terminated polydimethylsiloxane radicals, acryloxyalkyl tris(trimethylsiloxy silanes), acryloxyalkyl trimethylsiloxy terminated polyethylene oxide, chlorotrifluoro ethylene, glycidyl acrylate, 2-ethylhexyl acrylate, and n-butoxy methyl acrylamide.

Claim 77 (original): The method of claim 63, wherein the copolymer comprises one or more residues derived from other ethylenically unsaturated monomers of general formula V:



wherein R¹¹, R¹², and R¹⁴ are independently selected from the group consisting of H, CF₃, straight or branched alkyl of 1 to 20 carbon atoms, aryl, unsaturated straight or branched alkenyl or alkynyl of 2 to 10 carbon atoms, unsaturated straight or branched alkenyl of 2 to 6 carbon atoms substituted with a halogen, C₃-C₈ cycloalkyl, heterocyclyl and phenyl, R¹³ is selected from the group consisting of H, C₁-C₆ alkyl, COOR¹⁵, wherein R¹⁵ is selected from the group consisting of H, an alkali metal, a C₁ to C₆ alkyl group, glycidyl and aryl.

Claim 78 (original): The method of claim 77, wherein the other ethylenically unsaturated monomers are one or more selected from the group consisting of methacrylic monomers and allylic monomers.

Claim 79 (original): The method of claim 63, wherein the thermosetting composition is a liquid.

Claim 80 (original): The method of claim 63, wherein the thermosetting composition is a solid in particulate mixture form.

Claim 81 (original): A substrate coated by the method of claim 63.

Claim 82 (original): A substrate coated by the method of claim 79.

Claim 83 (original): A substrate coated by the method of claim 80.

Claim 84 (original): The thermosetting composition of claim 45, wherein said thermosetting composition includes a resinous phase dispersed in an aqueous medium, said resinous phase comprising (a), (b), and (c).

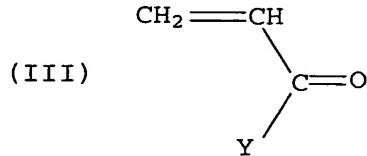
Claim 85 (original): A method of electrocoating a conductive substrate serving as an electrode in an electrical circuit comprising said electrode and a counter electrode, said electrode and counter electrode being immersed in an aqueous electrocoating composition, comprising passing electric current between said electrode and counter electrode to cause deposition of the electrocoating composition on the substrate as a substantially continuous film, the aqueous electrocoating composition comprising:

(a) an ungelled polymer containing one or more active hydrogen groups and one or more salt groups or groups which can be converted to salt groups;

(b) a curing agent having at least two functional groups which are reactive with the functional groups of (a); and

(c) a copolymer flow control agent comprising a copolymer comprised of at least 30 mol % of segments comprising alternating residues derived from a donor monomer selected from the group consisting of isobutylene, diisobutylene, dipentene and isoprenol, and an ethylenically unsaturated acceptor monomer, wherein said copolymer is substantially free of maleate-type monomer segments and fumarate-type monomer segments and the copolymer flow control agent is substantially free of Lewis acids and transition metals.

Claim 86 (original): The method of claim 85, wherein the ethylenically unsaturated acceptor composition in (C) is one or more acrylic monomers described by structure (III):



wherein Y is selected from the group consisting of $-\text{NR}^3_2$,

-O-R⁵-O-C(=O)-NR³₂, and -OR⁴, R³ is selected from the group consisting of H, linear or branched C₁ to C₂₀ alkyl, and linear or branched C₁ to C₂₀ alkylol, R⁴ is selected from the group consisting of H, poly(ethylene oxide), poly(propylene oxide), glycidyl, linear or branched C₁ to C₂₀ alkyl, alkylol, aryl, alkaryl and aralkyl, linear or branched C₁ to C₂₀ fluoroalkyl, fluoroaryl and fluoroaralkyl, a siloxane radical, a polysiloxane radical, an alkyl siloxane radical, an ethoxylated trimethylsilyl siloxane radical and a propoxylated trimethylsilyl siloxane radical, and R⁵ is a divalent linear or branched C₁ to C₂₀ alkyl linking group.

Claim 87 (original): The method claim 85, wherein the active hydrogen groups in the ungelled polymer of (a) are functional groups selected from the group consisting of carboxylic acid, hydroxy, methylol, amide, and carbamate and the functional groups of the curing agent (b) are reactive with the functional groups in the curing agent (b), and wherein the functional groups of the curing agent (b) are selected from the group consisting of epoxy, carboxylic acid, hydroxy, isocyanate, capped isocyanate, amine, methylol, methylol ether, and beta-hydroxyalkylamide.

Claim 88 (original): The thermosetting composition of claim 87, wherein the functional groups of the ungelled copolymer are hydroxy and the functional groups of the curing agent (b) are a capped polyisocyanate, wherein the capping group of the capped polyisocyanate crosslinking agent is selected from the group consisting of hydroxy functional compounds, 1H-azoles, lactams, ketoximes, and mixtures thereof.

Claim 89 (original): The method of claim 88, wherein the capping group is selected from the group consisting of phenol, p-hydroxy methylbenzoate, 1H-1,2,4-triazole, 1H-2,5-dimethyl pyrazole, 2-propanone oxime, 2-butanone oxime, cyclohexanone oxime, e-caprolactam, and mixtures thereof.

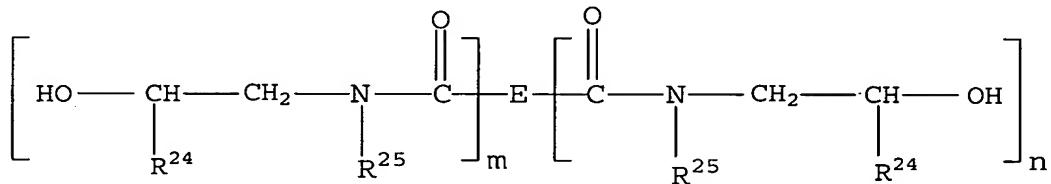
Claim 90 (original): The method of claim 88, wherein the polyisocyanate of said capped polyisocyanate curing agent is selected from the group consisting of 1,6-hexamethylene diisocyanate, cyclohexane diisocyanate, α,α' -xylylene diisocyanate, $\alpha,\alpha,\alpha',\alpha'$ -tetramethylxylylene diisocyanate, 1-isocyanato-3,3,5-trimethyl-5-isocyanatomethylcyclohexane, diisocyanato-dicyclohexylmethane, dimers of said polyisocyanates, trimers of said polyisocyanates, and mixtures thereof.

Claim 91 (original): The method of claim 88, wherein the capped polyisocyanate curing agent is present in an amount of from 1 to 45 percent by weight, based on total weight of resin solids, and the hydroxy functional copolymer is present in an amount of from 55 to 99 percent by weight, based on total weight of resin solids.

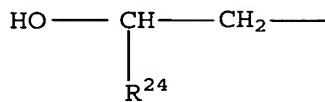
Claim 92 (original): The method of claim 85, wherein the active hydrogen groups of the ungelled copolymer of (a) are carboxylic acid functional groups and the curing agent (b) is a beta-hydroxyalkylamide compound.

Claim 93 (original): The method of claim 92, further comprising a second polycarboxylic acid functional material selected from the group consisting of C₄ to C₂₀ aliphatic carboxylic acids, polymeric polyanhydrides, polyesters, polyurethanes, and mixtures thereof.

Claim 94 (original): The method of claim 92, wherein the beta-hydroxyalkylamide is represented by the following formula:



wherein R²⁴ is H or C₁-C₅ alkyl, R²⁵ is H, C₁-C₅ alkyl or



for which R²⁴ is as described above, E is a chemical bond or monovalent or polyvalent organic radical derived from saturated, unsaturated, or aromatic hydrocarbon radicals including substituted hydrocarbon radicals containing from 2 to 20 carbon atoms, m is 1 or 2, n is from 0 to 2, and m+n is at least 2.

Claim 95 (original): The method of claim 85, wherein the salt group in (a) is anionic or cationic.

Claim 96 (original): The method of claim 85, wherein salt group in (a) is cationic and is selected from the group consisting of amine salt, quaternary ammonium, and ternary sulfonium.

Claim 97 (original): The method of claim 85, wherein the salt group is derived from at least one epoxy group-containing monomer which after polymerization has been post-reacted with an amine salt or an amine and acid.

Claim 98 (original): A substrate coated using the method of claim 85.